

WORKING PAPER

PROGRAMS FOR MIDDLE SCHOOL MATH: An Inventory of Existing Technology

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Policy Analysis for
California Education
<http://www.edpolicyinca.org>

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February 2012

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Executive Summary

This report provides information regarding existing technology programs that are used to teach middle school mathematics. The goal is to provide an overview of options currently available, and to organize the information for policymakers. This inventory of programs is subdivided into three categories: all inclusive programs, targeted programs, and apps. All-inclusive programs are designed to provide instructional, practice, and evaluation materials. Targeted programs differ because they attempt to provide only one of these three component parts. In most cases, targeted programs focus on providing additional practice and/or evaluation of students. Many of the targeted programs work to assist students who have struggled in the traditional learning environment. The final category of programs, apps, is focused on providing students with an engaging experience to practice their mathematical skill. However, these stand-alone programs are not usually associated with a specific curriculum.

This inventory shows that a wide variety of programs use technology to teach middle school mathematics. However, research on these programs is limited. While a few of the programs have participated in randomly controlled trials (RCTs), the vast majority has not been evaluated for effectiveness. As a result, we encourage researchers and policymakers to explore this gap in the research. What is clear is that a number of options currently exist for policymakers and educators looking to incorporate technology into the teaching of middle school mathematics. The following should not be considered an all-inclusive list of every mathematical program available, as this is a rapidly evolving industry. Nevertheless, this report is intended to provide a broad inventory of existing programs.

Introduction

The purpose of this report is to provide an overview of the existing technology programs and curricular materials for teaching middle school mathematics. The implementation of the Common Core Standards provides an opportunity to explore the possibilities in which technologies and online resources can be utilized throughout California's education system. Further, the budget crisis has pushed policymakers, practitioners, and researchers to explore all options. This fiscal challenge, combined with an ever growing pressure to produce student achievement results, has created enormous pressure to identify and implement effective programs and materials. Our goal is to outline options for teaching mathematics in middle school in California, with the hope of helping policymakers better understand these issues.

Math curriculum has been a contentious issue in the State of California for many years. While textbooks, pedagogy, curricula, and the teacher credentialing process have all been heavily debated, there is also an understanding of the vital importance of learning mathematics effectively in middle school. One specific area of political controversy has been the issue of whether or not to require algebra to all eighth graders or not. The previous State Board of Education chose to implement a system that allows students to take algebra in the 8th or 9th grade. Mastering algebra is vital for students in two significant ways.

First, algebra helps students move from concrete to abstract thinking. This intellectual leap is vital in many courses throughout high school, and beyond. Until algebra, most students have only studied concrete ideas. Secondly, learning algebra provides the necessary tools and knowledge for students to succeed in a number of courses that are required to graduate high school in the state of California. Students need algebra to successfully master many science courses including physics and chemistry. As a result, middle school mathematics is vitally important to the

long-term success of students throughout California. Policymakers need to work to craft a coherent, effective plan that utilizes the best learning materials. This inventory is designed to help guide that work.

California has both the California State Standards (CSS) and the California Common Core Standards (CCCS). The relationship between these two standards exemplifies the political difficulties of educational policy for middle school mathematics. Requiring all students to complete Algebra I in the eighth grade is one significant area of contention. The State Board of Education (SBOE) did not pick a side in this debate, and has adopted both sets of standards: the CCSS (which presents Algebra I as a sequence that culminates in 9th grade) and the CSS, which require students to complete Algebra I in the 8th grade. Local districts and educators are left to figure out which set of standards to follow.

A 21 member Academic Content Standards Commission (ACSC), established by Senate Bill X5 1 in January 2010, developed the California Common Core Standards. A substantial amount of the CCCS overlaps with the California State Standards. Major differences in the math portion include the organization of the standards themselves, options available to eighth grade students, and shifting some of the skills to new grade levels. The goal of the CCCS was to develop standards that were research-based, and more closely aligned to international benchmarks. The most recent projected timeline for implementation of the math portion of the CCCS is an adoption of new frameworks in January 2012, adoption of new instructional materials in August of 2014, and new instructional materials available for schools in December of 2014. This schedule is tentative.

Background Information

Mathematics education in the United States has long been a debated topic. Part of the controversy stems from US students performing consistently at the bottom end of the range of industrialized nations on international math assessments (Cogan et al 2001; Schmidt et al, 1997). In particular, the Third International Mathematics and Science Study (TJMSS) provides significant empirical evidence that students in the United States are scoring well below similar students in other nations. These data have been analyzed and largely used to argue that substantial changes need to occur in the teaching, curriculum, and course offerings of the middle school level (Schmidt, et al, 1997; Cogan, et al, 2001).

Additional research has explored the use of technology in education. In some cases, positive effects of using technology to improve student achievement have been found (Reid-Griffin & Carter, 2004). Another possible benefit of using technology in the classroom is that it may lead to better student engagement. Since most technology programs are highly individualized, students are able to target the exact concept or area where they need help. Other research has found that students are more willing to make mistakes when working individually on computers. Recent programs have expanded to also include a substantial data collection and analysis component as well. Teachers, or parents, may use this information to better help individual students, or identify areas where groups of students may need additional help. Clearly, there are many benefits to using technology in the classroom.

Current Online options- An Inventory

As one might imagine, current technologies and online options vary substantially. Part of this variance is due to the relative ease with which these materials can be developed. In fact, some existing math programs utilize open source

software, or other free online materials. The goal of this inventory is to provide a broad overview of existing materials. This is not an all-inclusive list; however, we outline major programs as well a representation of programs that took differing approaches. Please see the annexed table for a comprehensive list of current options to teach mathematics. Some of these options do not directly address teaching algebra or teaching middle school students, but focus more generally on mathematics in middle school. To better organize the programs that we view as viable options, we have organized the current programs into three sections. The first grouping is a list of programs that seek to be "**all inclusive**" math programs. These programs attempt to teach, they let students practice, and they evaluate student knowledge. The second grouping includes programs attempting to help struggling students, or students who do not understand a particular subject(s) in the traditional setting. We will refer to this grouping as "**targeted**" programs. Finally, the third grouping is programs designed to allow students to practice their skills. We will refer to these programs as "**apps.**"

All-inclusive programs

Many current technology and online sources contain components that teach students new ideas, let them practice concepts, track their progress, and even tests their mastery. Some of these programs also sort data for educators and parents. These programs vary in their depth, breadth, costs and effectiveness. Districts have also used these programs to supplement traditional education. Other districts have moved into a more formalized structure where one of these programs essentially encompasses the math program.

Agile Mind is a program that was founded at the University of Texas at Austin to improve equity and achievement in mathematics and science. The program provides a number of online tools and strategies for students to practice their skills. Currently, the program has been used in over 900 schools nationwide. The all-inclusive program provides units within each course, with recommended lessons, pacing guides, and guiding discussion questions for teachers. Formative and summative assessments are provided as well, and teachers may track both individual and group level data. One possible drawback is the cost. The *I Can Learn* program works to provide a complete educational experience. One distinguishing feature of this program is that it has proven positive statistical results through randomly controlled trials (RCTs). The two main studies of 3541 and 2400 students respectively, have been peer reviewed by the US Department of Education's What Works Clearinghouse (Kirby, 2004; Kirby, 2006). Both reviews concluded that the studies met the RCT standards and had positive effects. A number of other reviews by the What Works Clearinghouse have not met the WWC evidence standards or have met the standards with reservations. The online program includes a warm up section, a lesson presentation with detailed lectures, an *I Can Learn* tutor, and quizzes. The tutor program prompts students to answer questions throughout the lesson, and includes a progression to help them proceed. If a student misses a question, the tutoring program offers hints, and then connects the student back to the part in the lesson that addresses the concept. The quizzes are graded instantly and the students receive feedback about their performance and what questions they missed. The benefits of this program are its very detailed materials, its tutor component, and its data system. One possible drawback of this system is its costs.

The Kahn Academy is another all-inclusive program. This program, founded by Sal Kahn in 2004, is a series of 10-20 minute YouTube lectures. Each lecture is delivered by Sal, who has three degrees from MIT. The only requirement to be able to access the Kahn Academy materials is a Google or Facebook account (both programs

are free). These lectures target specific concepts for students to learn. The program also has a "knowledge map" where students complete math exercises to earn rewards called badges. The knowledge map begins with basic elementary math concepts (addition 1) and moves through a series of calculus lessons. To advance, the students must successfully answers ten questions on a given topic in a row. If a student struggles, or decides they do not completely understand a given concept, they can link back to the appropriate lecture. The Kahn Academy also includes a coach login, where a teacher and/or parent may be connected to a student account. This allows a teacher to track topics a student has covered, how long they spent on that topic, the lectures they watched, and their proficiency. The benefit of this program is that it is very user friendly, it is free, and it tracks data well. Possible drawbacks include that it doesn't follow a prescribed curriculum and it requires the student to be driven. The Kahn Academy is currently piloting Kahn Academy 2.0 in Los Altos. Evidence from the pilot program is expected around January 2012.

The Ignite Math Program is another all-inclusive program. This program uses Ignite coaches to work alongside classroom teachers. The project based approached works to develop concrete goals for each classroom. The program provides multimedia videos and interactivities with offline print material, and works to develop lessons to connect with multiple intelligences. Ignite Math has lessons that are divided into units and topics, student course books, and teacher guides. Advantages of this program seem to be its comprehensive approach, its diverse pedagogical approach, and its sustainability. Possible drawbacks include cost and a data system that is not as developed as other programs.

Future School Math is a program with a twenty-five year history rooted in student tutoring. The program uses a "smart diagnostic tool" to analyze various student assessments. The program places a heavy emphasis on individualized education, and develops a plan for each student. Formative assessments are used in coordination with video tutorials, study plans, and student monitoring. While this program was initially a program that focused on struggling students, it has expanded in recent years. Advantages of this program are the formative assessments and individual customization. Possible disadvantages are that it is expensive, and that the activities do not seem as engaging.

The Sketchpad Lesson Link is a program that aligns to the California standards and textbooks. The program uses a problem-based approach to curriculum, and provides teachers with student materials and teacher resources. Face-to-face workshops focus on student work and classroom videos to allow teachers and teacher leaders an opportunity to assess their work. This is combined with on-site and virtual coaching that provides hands-on support to improve instructional practices. Finally, the program also provides moderated online courses to help teachers learn and implement the Common Core Standards for Mathematics. Clearly, the primary benefit of this program is its focused and detailed teacher support and training. The program also provides organized instructional materials for students. Possible drawbacks are both its cost and the fact that the program is engaging for some, and not all, students.

Targeted Programs

A number of other programs target specific sub-populations of students. These programs are usually designed to help students who are not successful in the traditional education environment. Districts have used these

programs to enhance credit-recovery, after-school tutoring, summer programs, or even to supplement special education courses. The use of technology has allowed these programs to individualize efforts to improve student learning by developing advanced formative assessments to identify exactly where students need help.

The Education 20-20 (E-2020) is one such program. This online program requires a district or individual to purchase a user identification(s), that allow a student to logon to the website at any time. Originally designed as a credit-recovery program, E2020 allows students to view online lectures, complete exercises, and even take exams. Schools have the ability to track the amount of time that students spend on the website, which activities they access, which activities they complete, and their proficiency. Districts may also alter the minimum score required to pass a given unit or course. For example, a district may set seventy-five as the minimum requirement to pass Algebra I. A district also has the option of selecting the various standards, objectives, and lessons for each course. This helps particularly during credit recovery situations, where some districts have chosen to require only the essential objectives within a given course. A student would then need to meet that requirement on the assessment for each of the units, and the final. Other features of E2020 include automated messages being sent to parents and educators if students begin to fall behind, real time progress reports, and a comprehensive data report developed for each skill within a given course and unit. E2020 is a program that is very well organized, and allows students to advance at their own pace. One possible drawback is the cost.

IXL is another program that is designed to help students practice math. This program targets K-8 students who are struggling in the traditional environment, and provides real-time reports to teachers. State standards and proficiency analyses are also included. While this program does have a lot of practice questions online, it seems to have very little in terms of instructional materials. As a result, this program may benefit students who have access to quality instructional content elsewhere. The site is well organized. For example, eighth grade students may click on any of the 255 skills in the math standards to practice. Benefits of this program are the amount of practice materials available, the real time reports, the strong tie to the standards, and the organization. Possible drawbacks include a lack of instructional materials, costs, and the program not having exercises designed for any student after 8th grade.

The Geometer's Sketchpad is another supplementary program. This online program is designed to provide introductory information, and focuses mostly on concept or skill development for grades 3-12. The Geometer's Sketchpad relies heavy on visualization tools, and allows for individual pacing. Schools may purchase a site license, which allows them to access lesson plans, videos, and activities for students. The program also provides professional development for teachers, but does not seem as user friendly as some of the other options. Advantages of this program are that it ties closely to the math standards, while drawbacks include costs and a lack of specific research on the program.

Explore Learning is a program that utilizes technology to allow students to supplement instruction. The focus of this program is to provide students with virtual manipulatives, called gizmos, to learn and practice various math skills. The program works to supplement instruction, and is highly correlated with state curriculum standards and over 200 textbooks. Finally, the program has a professional development component that works to maximize teachers' use of the program. The main benefit of the program is the gizmos, which are entertaining, creative, and

very detailed. However, possible drawbacks include the cost, as well as the fact that the program has not been evaluated by researchers.

Apps

A third category of programs focuses exclusively on developing students' skill. These programs are not meant to instruct, or supplement existing programs. Instead, these programs are designed to allow students to practice their skills in innovative ways. Many of these options are entertaining, and take advantage of a variety of platforms including Internet games and iPod applications. The goal of these programs is to provide a positive experience while improving current mathematical proficiency. However, these programs usually do not provide instruction for students, or data for teachers. As a result, these programs should be viewed exclusively as programs for students to build their proficiency.

A plethora of iPod apps are available for students to practice their math skills. These programs are designed to entertain, and to allow students quick access to what seems to be an endless amount of practice problems. Examples of these include DiaMath, Equation Genius, Wolfram Algebra, Algebra Touch, Math Ref, Algebra Solver, and Algebra Helper 1, all designed to practice algebra specifically. The benefits of these programs are that they are very cheap (usually free or under \$2), they are fun for the students, they allow the students to access them from anywhere, and they utilize a popular technology. Possible drawbacks of these programs are that a student must have the hardware to be able to access them, and these apps usually do not provide data back to teachers or parents. The hardware devices necessary to use these apps, including iPods or iPhones, are very popular, but are also expensive. iPods vary in cost from \$50 to \$300. This set of apps clearly engages students, but has not been formally studied to evaluate effectiveness, and does not directly tie to any specific curriculum.

Possible Options and Problems

The rapid advance of technology has allowed many programs to enter the market quickly. The benefit of this pace has been a massive expansion of the number of programs that are working to address improving mathematics education. However, this massive proliferation has led to wide variation in quality. To create an app for an iPod, for example, requires one to have knowledge of the technology. One problem is that this knowledge does not necessarily equate to knowledge of pedagogy, teaching and learning, or even what is best for students. A second major problem with the rapid expansion of technological programs for teaching mathematics is a lag in the research on these programs. While a few of these programs have worked hard to test their programs with empirical research, the vast majority has not been tested.

A curricular spine may be an option that California policymakers contemplate for the future of middle school mathematics education. This would provide a structure of a course without necessarily prescribing a specific way of obtaining results. This would provide flexibility for the incredible diversity between and within schools throughout the state. Teachers and/or schools would be allowed to adopt the various component programs to complete the curricular spine that they deemed best for their constituents. This option may also be attractive due to the variance in the quality and accessibility of technology between districts. This is one example of an option that would not force policymakers to choose one exclusive approach.

There are other policy options that may help integrate technology into the classroom more effectively. Some scholars have suggested reforming the contiguous counties rule that restricts student choice (Izumi, et al, 2010). For virtual charter schools, this is a significant obstacle. Izumi also recommends allowing multiple authorizers for charter schools, allowing teacher reciprocity, and attaching funding to each child as a way of providing additional policy supports for technological innovation (Izumi, et al, 2010). These options should be considered as policy looks to integrate more technology into schools.

Looming Questions

There are a number of key issues that need to be addressed as policymakers consider the future of mathematical education in California. One important question to ask and address is: what is the current technological capacity of schools throughout California? As policymakers consider the future role of many of these programs, the status of the infrastructure in schools will be very important. This is especially true considering the current fiscal restraints at the state and local levels. A thorough assessment of hardware, broadband quality, and software within California schools would be useful for policymakers moving forward.

Another important question is: what is the current teacher capacity for integrating technology into the classroom? With the increasing pace of technological reform and progress, it is important to consider possible challenges to implementation. One possible area of difficulty is that teachers may or may not be able to integrate these technologies effectively. Information should be gathered on the current teacher workforce, its knowledge of instructional technologies, and its ability to use these tools to help identify next steps. Policymakers should consider providing professional development opportunities for teachers and a realistic timeline to phasing new materials into the classroom to help lessen possible implementation problems. Long term, policymakers should consider adjusting teacher training to better prepare them to integrate technologies.

Next Steps

The goal of this report is to provide a broad inventory of existing programs that use technology to teach middle school mathematics. While this information will assist policymakers in the future, it is not meant to inform policy exclusively. Gathering a group of experts within the field of teaching mathematics will be an important step to prioritize and evaluate these programs. Additionally, a group of technology experts may help policymakers consider specific details regarding infrastructure and capacity when implementing these programs.

Conclusion

It is clear that California mathematics education at the middle school level can improve. Student performance on state, national, and international math assessments has fallen short of public expectations. A policy window has been created with the implementation of the Common Core Standards and the current financial crisis. Policymakers should look to explore new instructional materials to improve student learning.

There are a plethora of programs that attempt to improve mathematics education for middle school students. These programs vary substantially in their approach, design, and effectiveness. The three categories of programs that emerged through this research were the all-inclusive programs, targeted programs, and apps. All-inclusive programs strive to provide instruction, problem sets for students to practice their skills, and assessments that track student performance. Most targeted programs were designed for sub-populations of students who struggled in the traditional learning environment. These programs usually work to instruct in a different way, or allow students to practice their skills at their own pace. Apps are the newest category of programs, and allow students to practice their skills in creative and exciting ways. These programs do not address instruction or assessment, and usually require students to have access to expensive hardware. There is substantial variation within each major category.

The California budget situation is not going to improve anytime soon. As a result, policymakers should work to ensure to maximize the effectiveness of every dollar spent on education. The use of technology to teach middle school mathematics may improve student learning in a cost-effective manner. Careful analysis of the various program options is an important next step. All three categories of programs provide important possibilities to enhance student learning in the future.

Program Title/Website	Category	Usage	Main Features	Cost (as reported on website)	Advantages	Disadvantages
Jiji Math/ Mind Research Institute mindresearch.net	Targeted	19 states, 1000 school, 13000 teachers, based in Santa Ana, CA	A spatial/temporal approach, Jiji is a penguin who works through a number of problems that increase in difficulty. Students begin the program visually and are slowly introduced to language and symbols.	\$7500 unlimited license, or \$3000 a year for 60 student license, and \$200 a year for the renewal fee.	<ul style="list-style-type: none"> • The initial emphasis on the visual is better for ELL students. • Is entertaining. • Research shows increase in test scores. • It is research-based. 	<ul style="list-style-type: none"> • Teacher cannot track student progress. • Mostly K-5 games with only a little algebra preparedness.
Khan Academy/ khanacademy.org	All inclusive.	Piloted in schools in Los Altos, CA, but has not expanded formally into many schools.	Students work through a progression in what is called a map of knowledge, beginning with basic addition and moving through calculus. The site has over 2100 lectures (about 25% are math related). Each topic has a 10-12 minute video followed by exercises to test student understanding. If students respond correctly 10 times in a row, they can move up to the next topic. If a	A completely free service available online via YouTube.	<ul style="list-style-type: none"> • Student tracking for teachers. • Lectures are brief and informative. • Students can control the pace. 	<ul style="list-style-type: none"> • This program is not tied to any specific standards. • It has not been extensively explored at scale.

Program Title/Website	Category	Usage	Main Features	Cost (as reported on website)	Advantages	Disadvantages
			student is struggling with a topic, there are links to the appropriate lecture. Teachers can monitor their students' progress (how much time they took, percentage of correct answers, which lectures they viewed). Videos are also available in Spanish.			
E2020/ education2020.com	Targeted	Used as a credit recovery program nationwide.	Students logon to an online system that has lectures, practice problems, and exams. Schools or teachers can set a passing rate for each exam, and can require students to watch films. It is a well organized site.	Unknown.	<ul style="list-style-type: none"> • Lessons are presented in a professional manner. • There is quality tracking for student performance. • There is the ability to logon any time (whilst still being tracked). 	<ul style="list-style-type: none"> • Currently only used for credit recovery. • This program has not been used as a base curriculum before.
Agile Mind/ agilemind.com	All-inclusive	Used throughout the country.	Provides detailed lessons within each unit. Includes teacher tips, pacing guides, and formative and summative	Unknown.	<ul style="list-style-type: none"> • Excellent tracking mechanism • Clear units and pacing guides • Both formative and summative 	No apparent disadvantages at this time.

Program Title/Website	Category	Usage	Main Features	Cost (as reported on website)	Advantages	Disadvantages
			assessments. Teachers may track student progress. The program shows both individual and group level data.		assessments	
<i>Assessment and Learning Knowledge Spaces (ALEKS)/</i> aleks.com	Targeted	Throughout the country.	This is an artificially intelligent assessment and learning system with adaptive questioning that quickly determines a student's knowledge. The program reassesses itself throughout to make sure the student is in the correct learning place. It also has knowledge of space theory and avoids MC.	Unknown.	<ul style="list-style-type: none"> • Spanish and English instruction available. • It avoids MC. • Reassesses students frequently. 	<ul style="list-style-type: none"> • This program does not appear to be tied closely to any curriculum. • There are less teacher tools than in other programs.
<i>Education Program for Gifted Youth (EPGY)/</i> epgyschools.stanford.edu	Targeted	Mostly in CA, but it is also expanding.	This program is for K-7; it sets an individualized pace; it reports data to teachers and assisting students; it was created initially for high achievers.	Roughly \$500 per course.	<ul style="list-style-type: none"> • Challenging curriculum. • Quality data reporting. 	<ul style="list-style-type: none"> • Minimum test scores for students to use. • This program is expensive. • Designed as an advanced course.
<i>IXL/</i> ixl.com	Targeted	All over the country.	The website is designed to help students practice	\$199 per year per classroom.	<ul style="list-style-type: none"> • This program is standards based. 	<ul style="list-style-type: none"> • It was designed for struggling students.

Program Title/Website	Category	Usage	Main Features	Cost (as reported on website)	Advantages	Disadvantages
			math (K-8) with real-time reports to teachers. It includes state standards and proficiency analysis. It is also recommended for struggling students.		<ul style="list-style-type: none"> • Teacher views are real-time reports. • Can click on any skill (255 for 8th grade) and it will take you to the exercises. 	<ul style="list-style-type: none"> • It has tests for students but it does not seem to have many instructional materials.
<i>Ignite! Math/</i> igniteforschools.com	All-inclusive	Sporadically used throughout the country, though it appears to be a new program.	This site features multimedia videos and interactive content with structured offline print materials. The program works to teach multiple intelligences and provides formal assessments and quizzes alongside informal assessments in print materials. Grades 4-8.	Unknown.	<ul style="list-style-type: none"> • Lessons are divided into units and topics. • Student course book provided. • Teacher guides provided. 	<ul style="list-style-type: none"> • We are not sure if progress is tracked to the teacher or not. • It has not yet been used extensively.
<i>Explore Learning/</i> explorelearning.com	Targeted	Used throughout CA and the country.	This program is research based and is designed to supplement the curriculum. It uses "gizmos" to teach (like electronic manipulatives).	Unknown.	<ul style="list-style-type: none"> • Gizmos seem advanced and interesting. • An engaging program with a very creative presentation. 	The program seems more supplemental as it is not designed as a stand-alone program.
<i>Future School Mathematics/</i> futureschools.com	All-inclusive	Used nationwide and internationally.	This program has been in use over 25 years. It provides	\$35 per month for 5 student accounts and one parent	<ul style="list-style-type: none"> • Data tracking appears to be extensive. 	<ul style="list-style-type: none"> • Activities do not seem as engaging.

Program Title/Website	Category	Usage	Main Features	Cost (as reported on website)	Advantages	Disadvantages
			tutoring for students; a Smart Diagnostic Tool for analyzing student assessment; formative assessment; video tutorials; study plans; and student monitoring.	account, or, \$95 per student, per year.	<ul style="list-style-type: none"> • Individualized education plan for each student. Study plans. It has a CA curriculum already entered with CA courses. 	<ul style="list-style-type: none"> • It is expensive. Lectures are dry.
<i>Sketchpad Lesson Link/</i> keyonline.keypress.com	All-inclusive	Used nationwide.	This site provides introductory information with concept or skill development. It provides a math overview for grades 3-12, with activity notes and student worksheets that is aligned to CA standards and textbooks	\$1199 for a small school (less than 500 students); \$1899 for a medium school (500-1000 students); and \$2499 for a large school (1000-2500) students.	<ul style="list-style-type: none"> • It is tied to CA standards. • It is very well organized. • Provides group or individual plans. • It is a problem-based curriculum. 	<ul style="list-style-type: none"> • It doesn't seem as innovative. • It has less data-tracking. • It is expensive.
<i>The Geometer's Sketchpad/</i> dynamicgeometry.com	Targeted	CA, nationwide	This visualization tool provides introductory information alongside concept or skill development for grades 3-12.	A school license with 50 computers is \$1000 per year.	<ul style="list-style-type: none"> • It has a strong visual component. • Individualized pacing. 	<ul style="list-style-type: none"> • Not a full curriculum. • It is supplemental.
<i>Tinkerplots: Dynamic Data Exploration/</i> keypress.com	Targeted	CA	A data exploration website for grades 4-7 only. Students can insert new data	\$700 for a school license with 50 computers.	<ul style="list-style-type: none"> • Strong data analysis program. • Students learn 	<ul style="list-style-type: none"> • Restricted to working with data sets. • Expensive for

Program Title/Website	Category	Usage	Main Features	Cost (as reported on website)	Advantages	Disadvantages
			or explore existing data sets; build graphs, text and photos.		about data sets, graphs, charts, etc.	limited scope.
Brightstorm online Videos for Math Exam Prep/ Brightstorm.com	Targeted	Nationwide	Over 2000 very detailed lectures from algebra to calculus. Test preparation for PSAT, SAT, and ACT.	Most of the lectures are free but test preparation materials must be purchased for an unlisted sum of money.	<ul style="list-style-type: none"> • Lectures are very technically detailed. • Much information • The site is well organized 	<ul style="list-style-type: none"> • There is nothing to prepare for algebra. • This program may be too advanced for middle school students. • Lectures may be too dry. • It does not provide teacher resources or tracking tools.
I Can Learn Program/ icanlean.com	All-inclusive.	New Orleans, but has expanded.	This program presents a warm-up section, lesson presentations with lecturers, I CAN Learn tutors and quizzes that are graded upon completion.	\$300 per year for an online professional development for teachers grades 6-8.	There are quality lectures. Materials and sections are well organized.	

* This information was collected in the summer of 2011 and may not be up-to-date.

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